

LTV Steel Company  
VIA EXPRESS MAIL

June 5, 1990

Mr. Sy Levine, P.E.  
Regional Manager  
Division of Air Pollution Control  
Illinois Environmental Protection Agency  
1701 S. First Avenue  
Maywood, IL 60153

Re: Benzene Waste NESHAP  
90-Day Report

Dear Mr. Levine:

On March 7, 1990, U.S. EPA promulgated final regulations with respect to the National Emission Standards for Hazardous Air Pollutants (NESHAPS) for benzene waste operations at coke by-product recovery plants. As provided by 40 CFR 61.357, LTV Steel Company, Inc. hereby submits the attached 90-day Report for its Chicago, Illinois coke plant.

The attached report includes a summary of all process streams which will be controlled under Subpart L prior to the compliance date of March 7, 1992 for Subpart FF wastes. These sources were previously addressed in detail in the Compliance Status Report transmitted to the agency on December 11, 1989.

Waste streams subject to the March 7, 1990 regulation, but not included in the previous submittal, are included in the attached report, thereby closing the loop on benzene emissions from coke by-product recovery plants.

If you have any questions regarding this report, please contact me.

Very truly yours,

EPA Region 5 Records Ctr.



307697

Mary Lou Harmon  
Mary Lou Harmon, Manager  
Air Quality Control

MLH/dcr/5697a

Attachment

cc: C. Kryzmowski, IL EPA

**AN EVALUATION OF  
BENZENE WASTE OPERATIONS  
AT LTV CHICAGO PLANT**

**Prepared for:**

**LTV CORPORATION  
ENVIRONMENTAL CONTROL DEPARTMENT  
3100 EAST 45TH STREET  
CLEVELAND, OHIO**

**Prepared by:**

**KEYSTONE ENVIRONMENTAL RESOURCES, INC.  
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**JUNE 1, 1990**

**PROJECT NO. 310600**



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## 1.0 INTRODUCTION

On March 7, 1990, United States Environmental Protection Agency (U.S. EPA) promulgated regulations for "Benzene Waste Operations" as part of the National Emissions Standards for Hazardous Air Pollutants (NESHAP) Program (40 CFR Part 61).

The NESHAP Program was established by Section 112 of the Clean Air Act to identify and control pollutants which "...may reasonably be anticipated to result in an increase in mortality, or an increase in serious irreversible, or incapacitating reversible illness." Regulations to implement Section 112 were promulgated in 40 CFR Part 61. On June 8, 1977 (42 FR 29332) the U.S. EPA determined that benzene is a hazardous air pollutant pursuant to Section 112 of the Clean Air Act and has promulgated regulations to control the release of benzene. On September 14, 1989, (54 FR 38073) U.S. EPA promulgated regulations which control benzene emissions from Coke By-Product Recovery Plants. Sources controlled by these regulations are referred to as "benzene process emissions." The March 7, 1990 promulgation of additional regulations, which addresses benzene waste operations, compliments the benzene process emissions regulations by focussing on those benzene-containing streams which exit the process, but are not products or by-products.

This report follows an investigation of the Chicago Plant by Keystone Environmental Resources, Inc. during which process and non-process streams were identified and observed. This information is compiled into a summary table which identifies each waste stream and the "annual benzene quantity" which it contains. The total of all such regulated sources are then compared to the "trigger quantities" as described in Section 2.4.2 below.

This report is submitted to satisfy the requirements of 40 CFR 61.357 - Reporting requirements and summarizes the regulatory status of each waste stream. The report is based upon "knowledge of waste" and not the results of testing by the procedures specified in 40 CFR 61.355.

## **2.0 BACKGROUND**

### **2.1 Section 112 of the Clean Air Act**

National Emissions Standards for Hazardous Air Pollutants (NESHAPs) have been developed for those pollutants which "...may reasonably be anticipated to result in an increase in mortality, or an increase in serious irreversible, or incapacitating reversible illness." The statute requires NESHAPs to be set at a level adequate to protect the public health with an ample margin of safety. The 1977 amendments revised Section 112 to authorize the EPA to set design, equipment, work practice or operational standards where numerical emission limits would not be practicable. NESHAPs apply to existing as well as new sources. The latter must comply at the time of commencement of operations. Existing sources, however, may delay compliance for a period of up to two years.

### **2.2 NESHAPs Regulations**

The NESHAPs Regulations 40 CFR Part 61A identifies eight air pollutants as being hazardous. It also establishes general principles for the operation of the NESHAPs Program and a time table for compliance.

40 CFR 61.05 (a) - Prohibited Activities, specifies that an existing source must be in compliance with an applicable standard within 90 days of the effective date of the standard, unless the Administrator grants a waiver for that date. 40 CFR 61.11(a) - Waiver of Compliance, allows the Administrator to grant a waiver of up to two years from the date of promulgation.

### **2.3 Benzene Emissions from Coke By-Product Recovery Plants**

The National Emissions Standards for Benzene Emissions from Coke By-Product Recovery Plants are contained in 40 CFR Part 61L. 40 CFR 61.130(a) lists sources of benzene which are to be controlled. They are as follows:

- o Tar Decanters (flushing liquor decanters)
- o Tar Storage Tanks (tar dewatering tanks)
- o Tar Intercepting Sumps (primary cooler decanters)
- o Flushing Liquor Circulation Tanks
- o Light Oil Sumps
- o Light Oil Condensers
- o Light Oil Decanters (light oil separators)
- o Wash Oil Decanters
- o Wash Oil Circulation Tanks
- o Naphthalene Processing
- o Final Coolers
- o Final Cooler Cooling Towers
- o Benzene Storage Tanks
- o BTX Storage Tanks
- o Light Oil Storage Tanks
- o Ammonia Liquor Storage Tanks

Also included are pumps, valves, exhausters, pressure relief devices, sampling connection systems, open-ended valves or lines, flanges and other connections and control devices "In Benzene Service." "In Benzene Service" means that the fluid contains more than 10% benzene, or in the case of an exhauster, 1% benzene.

## **2.4 Benzene Waste Operations**

The Benzene Waste Operation Regulations - 40 CFR Part 61 FF focuses on the regulation of benzene wastes from a number of processes including coke making. 40 CFR 61.341 - Definitions defines "waste" as a material which is to be discarded or which is accumulated, stored or treated prior to being discarded, recycled or discharged.

40 CFR 61.357 - Reporting Requirements , establishes the schedule of compliance with the benzene waste operation regulation. The schedule is as follows:

Within 90 days the owner shall determine the regulatory status of each waste stream along with its annual benzene quantity. (See Sec. 2.4.1 below)

By March 7, 1992 the owner shall certify that necessary equipment has been installed and tested.

The general standards contained in 40 CFR 61.342 explain that the degree of regulation is dependent upon the aggregate amount of benzene in the facilities process wastes. These categories are as follows:

- o Less than 1 Megagrams per year (Mg/yr) (1.1 tons/yr) - initial notification
- o Between 1 and 10 Mg/yr (1.1 to 10.1 tons/yr) - annual reporting
- o Greater than 10 Mg/yr (10.1 tons/yr) - controls required.

In making the above determination, the waste stream must contain greater than 10 percent water by weight. In addition those streams which are not controlled as a process or equipment regulated under 40 CFR 61L (benzene process emissions) (See Section 2.3 above) are not included in the determination.

Those waste stream containing more than 10 percent water by weight are subject to control if the facility total annual benzene quantity is greater than 10 Mg/yr and the specific waste stream contains more than 10 ppm benzene.

Facilities which have an annual benzene waste quantity in excess of 10 Mg/yr are subject to controls as specified in 40 CFR 61.343-348 which identifies specific sources requiring control as well as the control strategy and performance standards that such controls must attain. Controls are required until the quantity of benzene waste which is not to be controlled is less than 1 Mg/yr. (See Section 2.4.3 below)

### **2.4.1 Initial Reporting Requirements**

The owner or operator must make an initial determination of the total amount of benzene contained in the wastes managed at the facility by either waste testing or documented "knowledge of the waste." Benzene in waste streams containing less than 10% water is excluded from this determination and from the benzene controls.

An initial report must be submitted within 90 days (by June 5, 1990) and must include the following:

1. Total annual benzene quantity from the facility waste using the test methods and procedures established in 40 CFR 61.355 or "Knowledge of the Waste." The total annual benzene quantity from facility waste is the sum of the annual benzene quantity for each waste stream at the facility that has a flow-weighted annual average water content > 10%;
2. A table identifying each waste stream and whether or not the waste stream will be controlled for benzene emissions;
3. For each waste stream identified as not being controlled
  - a. Whether the water content is > 10%;
  - b. Whether the waste stream is a process wastewater stream, product tank drawdown or landfill leachate;
  - c. Annual waste quantity for the waste stream;
  - d. Range of benzene concentrations for the waste stream;
  - e. Annual average flow-weighted benzene concentration for the waste stream; and
  - f. Annual benzene quantity for the waste stream.

### **2.4.2 Standards**

If the total annual benzene quantity from the facility waste is <1 Mg/yr (1.1 tons/yr), the documentation must be maintained and no further action is required



unless a change in the process could cause the total annual benzene quantity from facility waste to increase to 10 Mg/yr or more.

If the total annual benzene quantity from the facility waste is <10 Mg/yr (10.1 tons/yr), but equal to or >1 Mg/yr, a report must be submitted annually and whenever there is a change in the process generating the waste stream that could cause the total annual benzene quantity from facility waste to increase to 10 Mg/yr or more.

If the total annual benzene quantity from the facility waste is equal or >10 Mg/yr, controls are required.

### **2.4.3 Control Requirements**

**A. For each waste stream other than process wastewater:**

- 1. Remove or destroy the benzene contained in the waste by designing, installing, operating and maintaining a treatment process that:**
  - a. Removes benzene from the waste stream to a level <10 ppmw on a flow-weighted annual average basis, or**
  - b. Removes benzene from the waste stream by 99% or greater, or**
  - c. Destroys benzene in the waste stream by incinerating the waste in a combustion unit that achieves a destruction efficiency of 99% or greater.**
- 2. Comply with the standards set forth in the regulation for each waste management unit that receives or manages the waste stream prior to and during treatment of the waste stream.**

3. Comply with the standards set forth in the regulation for waste streams that will be recycled. Once the waste stream is recycled to a process, the material is no longer subject to treatment (however, controls may be required prior to recycle).
4. Dilution is not allowed; however, mixing of waste streams to facilitate treatment is allowed.

**B. For process wastewater:**

Process wastewater shall be treated to achieve a total annual benzene quantity from facility process wastewater  $< 1$  Mg/yr. Total annual benzene quantity from facility process wastewater shall be determined by adding together the annual benzene quantity at the point of waste generation for each untreated process wastewater stream plus the annual benzene quantity exiting the treatment process for each treated process wastewater stream.

**C. Exemptions to Treatment**

A waste stream is exempt from treatment if:

1. The flow-weighted annual average benzene concentration is  $< 10$  ppmw.
2. The process wastewater stream flow rate is  $< 0.01$  liters/min.
3. The annual waste quantity of the process wastewater stream is  $< 10$  Mg/yr.
4. It can be shown that, by controlling other streams, the total benzene in both the untreated and treated process wastewater is  $< 1$  Mg/yr.

### **3.0 TECHNICAL APPROACH**

In preparing the tables that summarize the annual waste quantity for the Chicago Plant, an inspection was made to observe each waste stream. The report entitled, "Benzene NESHAP Compliance Status Report and Request for Waiver," dated December 11, 1989 was also reviewed and modifications to the process which are planned to comply with Subpart L are shown in Table 3-1. The information collected during the inspection is presented in two tables.

- o Table 3-2 - Potential Benzene Waste Sources - lists equipment, sumps, and tanks that contain a process stream which could come into contact with benzene. The report entitled, "Benzene NESHAP Compliance Status Report and Request for Waiver," was reviewed. Proposed modifications denoted by the December 11, 1989 report to meet Subpart L requirements are included in this table, along with other streams which are identified in the field as possibly containing benzene.
- o Table 3-3 - Benzene Waste Quantity Determination - Waste streams which are identified in Table 3-2 as being a Subpart FF waste stream are assessed to determine their contribution to the facility's annual waste quantity.

#### **3.1 Benzene Waste Sources**

Table 3-2 lists the equipment and processes which are the potential sources of benzene wastes. In the cases where process or equipment modifications are specified in "Benzene NESHAP Compliance Status Report and Request for Waiver" under Subpart L of NESHAPs an appropriate entry is made. The specific entries in the table are as follows:

**EQUIPMENT** - The identity of each source or process, segregated by process area, which is identified as being a potential source of benzene emissions at the plant.

TABLE 3-1

LTV STEEL \*  
CHICAGO WORKS  
COKE PLANT

	POINT OF EMISSION	PROPOSED MODIFICATION	% REDUCTION
1	Raw Liquor Storage Tank	Gas Blanket	98
2	Raw Liquor Tank (Slop Tank)	Gas Blanket	98
3	Tar Storage Tank	Gas Blanket	98
4	Tar Storage Tank	Gas Blanket	98
5	Tar Storage Slop Tank	Gas Blanket	98
6	Light Oil Storage Tank	Gas Blanket	98
7	Light Oil Storage Tank	Gas Blanket	98
8	Light Oil Storage Tank	Gas Blanket	98
9	Light Oil Storage Tank	Gas Blanket	98
10	Light Oil Storage Tank	Gas Blanket	98
11	Light Oil Slop Tank	Gas Blanket	98
12	Light Oil Off Loading Pumps	Install Sealless Pumps or Double Seals	100
13	Intercepting Light Oil Tank	Gas Blanket	98
14	Hot Oil Slop Tank	Gas Blanket	98
15	Drain Sump	Eliminate Wash Oil From Sump	100
16	Vapor Condenser	In Compliance	-
17	Final Vapor Condenser	Gas Blanket	98
18	Rectifier Condenser	Operation Has Been Discontinued	-
19	Holding/Separating Tank	Gas Blanket	98
20	Primary Light Oil Holding Tank	Operation Has Been Discontinued	-
21	Debenzolized Wash Oil Tank	Gas Blanket	98
22	Benzolized Wash Oil Tank	Gas Blanket	98
23	Makeup Wash Oil Tank	Gas Blanket	98
24	Light Oil Storage Tank	Gas Blanket	98
25	Wash Oil Recovery Condenser	Operation Has Been Discontinued	-
26	Wash Oil Recovery Condenser	Operation Has Been Discontinued	-
27	Recovered Wash Oil Tank	Gas Blanket	98
28	Light Oil Pump	Install Sealless Pumps or Double Seals	100
29	Light Oil Pump	Install Sealless Pumps or Double Seals	100
30	Flushing Liquor Decanter	Gas Blanket	98
31	Flushing Liquor Decanter	Gas Blanket	98
32	Excess Flushing Liquor Tank	Gas Blanket	98
33	Tar Pumping Station Tank	Gas Blanket	98
34	Thin Film Evaporator	Operation Has Been Discontinued	-
35	Froth Flotation Tank	Gas Blanket	98
36	Backwash Holding Tank	Gas Blanket	98
37	Intercepting Tank	Gas Blanket	98
38	Primary Cooler Drip Pot	Gas Blanket	98
39	Primary Cooler Drip Pot	Gas Blanket	98
40	Primary Cooler Drip Pot	Gas Blanket	98
41	Exhauster Seal Pot	Gas Blanket	98
42	Exhauster Seal Pot	Gas Blanket	98
43	Spent Oil Tank	Gas Blanket	98
44	Tar Precipitator Drip Pot	Gas Blanket	98
45	Tar Precipitator Drip Pot	Gas Blanket	98
46	Slop Tank	Gas Tight Cover and Conservation Vent	100
47	Slop Tank	Gas Tight Cover and Gas Blanket	98
48	Enriched NH3 Liquor Storage Tank	Gas Blanket	98
49	Strong Ammonia Liquor Tank	Gas Blanket	98

\* Attachment #1 of "Benzene NESHAP Compliance Status Report and Request for Waiver" dated December 11, 1989.

TABLE 3.2  
LTV CHICAGO PLANT  
BENZENE WASTE SOURCES

EQUIPMENT	SUBPART L	SUBPART L	SUBPART FF
	EMISSION POINT (1)	PROPOSED MODIFICATION (2)	WASTE STREAM (3)
RAW LIQUOR STORAGE TANK	YES	GAS BLANKETING	NO
SLOP TANK (RAW LIQUOR)	YES	GAS BLANKETING	NO
TAR STORAGE TANKS	YES	GAS BLANKETING	NO
TAR STORAGE TANK DRAW DOWN	YES	HARD-PIPE TO SUMP	NO
SLOP TANK (TAR STORAGE)	YES	GAS BLANKETING	NO
LIGHT OIL STORGE TANKS	YES	GAS BLANKETING	NO
SLOP TANK (LIGHT OIL)	YES	GAS BLANKETING	NO
LIGHT OIL OFF LOADING PUMPS	YES	INST. SEALLESS PUMPS	NO
INTERCEPTING LIGHT OIL TANK	YES	GAS BLANKETING	NO
HOT OIL SLOP TANK	YES	GAS BLANKETING	NO
DRAIN SUMP	YES	ELI. WASH OIL FROM SUMP	NO
VAPOR CONDENSOR	YES	IN COMPLIANCE	NO
FINAL VAPOR CONDENSOR	YES	GAS BLANKETING	NO
RECTIFIER CONDENSOR	YES	VESSEL NOT IN USE	NO
LIGHT OIL DECANTER	YES	GAS BLANKETING	NO
LIGHT OIL DECANTER DRAW DOWN	YES	HARD-PIPE TO SUMP	NO
PRIMARY LIGHT OIL HOLDING TANK	YES	VESSEL NOT IN USE	NO
DEBENZOLIZED W.O. STORAGE TANK	YES	GAS BLANKETING	NO
BENZOLIZED WASH OIL STORAGE TANK	YES	GAS BLANKETING	NO
WAKE-UP WASH OIL STORAGE TANK	YES	GAS BLANKETING	NO
LIGHT OIL STORAGE TANK	YES	GAS BLANKETING	NO
LT. OIL STORAGE TANK DRAW DOWN	YES	HARD-PIPE TO SUMP	NO
WASH OIL RECOVERY CONDENSOR	YES	VESSEL NOT IN USE	NO
RECOVERED WASH OIL TANK	YES	GAS BLANKETING	NO
LIGHT OIL PUMPS	YES	INST. SEALLESS PUMP	NO
FLUSHING LIQUOR DECANTERS	YES	GAS BLANKETING	NO
EXCESS LIQUOR TANK	YES	GAS BLANKETING	NO
EXCESS LIQUOR TANK DRAW DOWN	YES	HARD-PIPE TO SUMP	NO
TAR PUMPING TANK	YES	GAS BLANKETING	NO
THIN FILM EVAPORATOR	YES	VESSEL NOT IN USE	NO
FROTH FLOTATION TANK	YES	GAS BLANKETING	NO
BACK WASH HOLDING TANK	YES	GAS BLANKETING	NO
INTERCEPTING TANK	YES	GAS BLANKETING	NO
INTERCEPTING TANK PIT	NO	REPLACE PIT	NO
PRIMARY COOLER DIP POTS	YES	GAS BLANKETING	NO
EXHAUSTER SEAL POTS	YES	GAS BLANKETING	NO
BOOSTER SEAL POTS	NO	CHANGE SEALS	NO
EXHAUSTERS	YES	REPAIR LEAKS	NO
SPENT OIL TANK (MUCK OIL)	YES	GAS BLANKETING	NO
WASH MUCK OIL SLUDGE	NO	NONE REQUIRED	YES
TAR PRECIPITATOR DIP POTS	YES	GAS BLANKETING	NO
SLOP TANK AND SUMP PUMP	YES	GAS TIGHT COVER & G.B.	NO
ENRICHED LIQUOR STORAGE TANK	YES	GAS BLANKETING	NO
ST. AMMONIA LIQUOR STORAGE TANK	YES	GAS BLANKETING	NO
FIX AMMONIA STILL DISCHARGE	NO	NONE REQUIRED	YES
TAR DECANTER SLUDGE	NO	NONE REQUIRED	YES
GAS SYSTEM CONDENSATE	NO	NONE REQUIRED	YES

NOTES:

- (1) SUBJECT TO REGULATIONS PER 40 CFR 61.130.
- (2) SEE "BENZENE NESHAP COMPLIANCE STATUS REPORT  
AND REQUEST FOR WAIVER" DATED DECEMBER 11, 1989.
- (3) AS DEFINED IN 40 CFR 61.341.

TABLE 3.3  
LTV CHICAGO PLANT  
BENZENE ANNUAL WASTE QUANTITY

SUBPART FF WASTE STREAM	MOISTURE % water (1)	EXEMPT SUBPART FF WASTE STREAM (2)	WASTE STREAMS INCLUDED IN ANNUAL BENZENE	NATURE OF WASTE (4)	BENZENE ppm (1)	FLOW gal/day (1)	MASS LOAD Mg/yr (3)
Wash Muck Oil Sludge	0.65	yes	no	N.A.	N.A.	N.A.	N.A.
Fixed Ammonia Still Discharge	AQ (7)	no	yes	process wastewater	<0.001 (6)	73,000	0.225
Tar Decanter Sludge	8.2	yes	no	N.A.	N.A.	N.A.	N.A.
Gas System	AQ	no	yes	process wastewater	1.2	3,535	12.0

NOTES:

- (1) Based upon "Knowledge of Waste"
- (2) In accordance with 40 CFR 61.342(9)
- (3) Calculated
- (4) Definitions of Waste Stream 40 CFR 61.341
- (5) Detection Limit
- (6) N.A. - Not Applicable
- (7) AQ - Aqueous

12.2 #/yr benzene  
0.005 Mg/yr benzene

**SUBPART L EMISSION POINT** - Sources which were specifically identified in the 40 CFR 61.130 as being regulated under Subpart L.

**SUBPART L PROPOSED MODIFICATION** - Control devices, tank drain connections and changes in operations which are specifically identified in the report entitled, "Benzene NESHAP Compliance Status Report and Request for Waiver" to comply with Subpart L requirements.

**SUBPART FF WASTE STREAM**- Waste streams which are believed to be benzene-containing that are not regulated under Subpart L are identified. To be defined as a Subpart FF waste stream, the specified stream must meet the following criteria:

1. Comes into contact with benzene
2. Is a waste stream (meets both A and B below)
  - A. Meets any of the following:
    - Is process wastewater
    - Is being discharged from a product tank to remove water or other contaminants
    - Is discharged from a steam stripping unit, waste tank, or process drainage system after treatment
    - Is a sludge or slop oil, and
  - B. Meets any one of the following:
    - Is being discarded
    - Is being accumulated, stored, or treated before discarding, recycling, or discharging
3. Is not regulated under Subpart L

### **3.2 Benzene Waste Quantity**

Table 3-3 determines the annual benzene waste quantity for Subpart FF regulated streams. The specific column entries are as follows:

**SUBPART FF WASTE STREAM** - Subpart FF waste streams as identified in Table 3-2.

**MOISTURE** - The water content, expressed in percent by weight, of the waste stream.

**EXEMPT SUBPART FF WASTE STREAM** - Waste streams with less than 10% moisture are exempt from Subpart FF regulations. Such streams are so identified.

**WASTE STREAMS INCLUDED IN ANNUAL BENZENE** - Subpart FF waste streams which are not exempted are included.

**NATURE OF WASTE** - Specifies whether the waste stream is a process waste water, product drawdown or landfill leachate.

**BENZENE** - The concentration of benzene, expressed in ppmw, based upon "knowledge of the waste".

**FLOW** - The waste stream production rate expressed in gallons per day.

**MASS LOAD** - The annual amount of benzene in the waste stream expressed in Mg/yr. Only waste streams which have a moisture content greater than 10% are included. The quantities in the Mass Load column are summed to determine the annual benzene waste quantity.



### **3.3 Results**

The annual benzene emissions from the Chicago Plant are 0.005 Mg/yr.

#### **4.0 SUMMARY AND CONCLUSIONS**

The operations of the Chicago Plant of LTV Corporation have been assessed with regard to the NESHAPS Benzene Waste Operations (40 CFR Part 61FF) to determine the annual benzene waste quantity. Each individual waste stream was compared against the requirements of Subpart L - "National Emissions Standards for Benzene Emissions from Coke By-Product Recovery Plants" and the exemption requirements of Subpart FF.

The study concluded that the annual benzene quantity from the Chicago Plant is 0.005 Mg/yr. Accordingly, the facility is exempt from the control requirements of 40 CFR 61.342 (b) and (c).